World Leading Advanced Planning System of Lean Production

The world elite of lean production use Asprova:

In Japan, Asprova’s Advanced Planning and Scheduling System (APS) holds a market share of 52.4% (according to Fuji Keizai)
No contradiction anymore:  
cost reduction and maximum flexibility

How to deal with uncertainty?
How to balance the demands of market and production?

Current market demands

- increasing product variation
- shorter delivery times
- shorter ordering intervals
- unstable costs of raw material
- fluctuating demand
- short product lifecycles
- etc.

Demands towards manufacturers

- low stock levels
- shorter lead times
- precise and effective use of available resources (material, machinery, personnel, etc.)
- meeting delivery deadlines
- minimisation of scheduling and steering effort
- reduction of fixed costs by lowering of capacities

Example:

Market demands towards manufacturing companies become more and more complex. Many enterprises react by an increase of stock levels. The result is a growing number of “shelf warmers”, which will have to be disposed annually. Both problems considerably increase expenditures.

The higher the inventory, the more difficult it is to control. Due to a lack of transparency the number of defective parts increases. In spite of high stock levels, meeting delivery dates becomes more difficult.
ERP systems require complementation for advanced scheduling

Scheduling on the basis of predictable developments is outdated. Today industrial production is facing a growing dynamisation of markets. Like a well-trained body, production has to be able to react immediately and flexibly to any kind of change.

ERP systems support the management, especially from the perspective of controlling. They are a top-to-bottom solution with sequential logic for data management and are not suited for advanced planning purposes such as:

- 100% visualisation of production processes and orders
- quick planning computation
- production scheduling and optimisation

Asprova is a complementation to existing ERP systems.

Asprova APS responds to inquiries like these in real time:

- What is a realistic delivery date for a new order?
- How high is capacity utilisation – in total and by resource?
- What are the effects of prioritising the manufacturing of a certain order?
- What is the optimal starting point for individual manufacturing orders?
- Where are overlaps, bottlenecks or unused capacities?
- What is the optimal work plan/order sequence for individual resources?
- How to optimise production lead times and inventory?
- How to steer orders within the available resource capacities?

ERP system
(SAP, Oracle, Microsoft Dynamics, Baan, . . .)

Asprova Advanced Planning System

MES

Asprova Advanced Planning System
is the missing complementation to existing ERP systems.
Successful companies are lean, quick and flexible

Consistent implementation of lean production with Asprova APS

Typical success reports of Asprova users:
- shortening of process lead time by 50%
- reduction of inventory of WIP by 50%
- reduction of inventory of finished items by 30%
- increase in productivity
- drastic decrease in scheduling effort
- reduction of fixed and variable costs
- significant increase in flexibility and speed when adjusting to changing conditions

Many talk about the necessity of lean production but fail at implementing it consistently. Asprova is specifically tailored to the demands of lean production. It is for a reason that the system is utilised by the world elite of lean production.

Advanced planning with Asprova
(simplified diagram)

1. The ERP system regularly transfers new production orders to Asprova, including master data, process routes, stock levels etc.

2. Precise advanced production planning with Asprova by means of 100% visualisation of manufacturing by the system.

3. The planner can steer and optimise the settings easily and quickly.

4. Asprova issues work instructions and sends them directly to all work places concerned.

5. Or: Asprova sends work instructions to all work places concerned via ERP/MES.

6. The individual processes regularly send feedback to Asprova via ERP/MES, reporting the progress of orders.

7. The shop floor situation changes constantly. With the help of Asprova, the planner can easily control and optimise the current situation through re-scheduling.
Take the lead through speed and efficiency in scheduling

High speed scheduling enables real time picturisation of production

With 5000 arithmetic operations in 3 seconds, Asprova is the fastest scheduler on a worldwide scale. This makes it possible to

- synchronise complex manufacturing processes including supply chain, taking into account all capacity- and deadline-related dependencies and material availabilities in real time
- conduct simulations of various alternatives regarding feasibility, costs and delivery times.

Other conventional schedulers need a computing time of up to several hours for 100,000 arithmetic operations. Asprova masters this within less than 20 seconds, taking into account over 1000 parameters for each individual order.

Thanks to Asprova you are able to picturise the current production process 100 % and to create a simulation identical to the current situation.

Most APS systems are not capable of this, or only to a small extend. They often require further manual adjustments or even individual programming.

Compared to the previous version, the current generation of Asprova has increased operating speed by a factor of 4. 5000 arithmetic operations are carried out within only 3 seconds. This fast pace enables you to immediately determine the effects of any kind of change to the production process.
Exact advanced scheduling through 2400 parameters and 4000 properties

Over 2400 different parameters and 4000 properties within the Asprova system consider all conceivable standard situations in production. This enables a 100% picturisation of the current manufacturing process by the software without any individual programming.

The most significant parameters and setting options of Asprova:

**Resources:**
- simultaneous consideration of all resource capacities for the calculation
- simultaneous consideration of availabilities of main resources and sub-resources (e.g. machinery, right mould, left mould, workers, tools, etc.)
- setting of resource priorities
- timing of events (e.g. maintenance)

**Processes:**
- setting of setup time (internal/external setup, teardown) for individual machine, product, order
- maximum/minimum periods of stagnation or transport for intermediate processes
- allocation of splitting or merging processes
- maximum suspend times for setup and production
- splitting of lot sizes
- lot merging

A pilot can only steer if the instruments display the reality

100% picturisation of manufacturing processes in the scheduling system is an essential requirement of exact advanced scheduling.
100 % picturisation of current production in the scheduling system

Orders:
- instant calculation of realistic delivery dates for specific customer inquiries (in consideration of capacities and material availability)
- scheduling for months in advance
- individual setting of order priority
- automatic issuing of manufacturing order, triggered (in advance) by minimum stock levels of WIP or finished products
- automatic issuing of production schedule based on sales plan
- serving of orders from inventory, automatic issuing of manufacturing orders for missing volumes
- dynamic handling of rush orders: calculation of effects on existing orders and simulation of deliveries to assure on-time delivery of all orders

Raw material:
- scheduling on the basis of raw material availability, i.e. no scheduling without raw material
- consideration of the timing of incoming order-related material
- automatic order replenishment through 1-to-1 production (flexible volume adjustment according to stock levels and fixed volumes)
- pegging of inventory and period-specific safety stock, material constraints
- scheduling of standardised material input- and output for weeks/months in advance

Quality:
- setting of yield and scrap rate by product, by process and by resource in order to reach desired output volume (number of units), i.e. automatic adjustment of volume discrepancies for the first process.

Why Asprova is used in diverse industries:
- 4000 properties and 2400 parameters enable near 100% visualisation of production processes and methods
- additional programming only necessary in exceptional cases
- short and inexpensive implementation

Planning rules and priorities can be set individually for each order.

www.asprova.eu

The Leading Planning System for Lean Production
Speed through visual recognition of graphic elements

Graphic user interface for instant recognition and reaction

Scheduling results are displayed in the form of Gantt charts and visualise the entire production process from incoming order in take to delivery of the finished product. You are able to overview the entire production within seconds, both in the present state as well as several months into the future.

Through the graphic preview, you are able to instantly recognise e.g. looming delays in delivery and to initiate necessary measures to prevent them. The respective numerical information can be displayed additionally.

Overview of all orders in one diagram. It is possible to highlight and filter delayed orders. All processes connected to this order (including starting and ending times) become visible.

Main specifications and functionality of user interface:

- graphic highlighting of problems (delays in delivery, etc.)
- visualisation of connections between processes and orders
- individual display settings (colours, manner of data display, margins, tool bars, data tip, etc.)
- creating and checking the schedule for several months in advance
- consistent and continuous display of incoming and outgoing inventory, material planning, incoming orders, outsourcing, etc.
- individual changes of machine shifts
- manual assignment of orders (including undo/redo function) via mouse and keyboard
- filtering by particular processes/resources, e.g.: shift changes, result entry, result display, processes/resources
- instant visualisation of production results
- reduction of time axis to required units (calendar days, work time)
- zoom on individual processes
- switch to respective master data, diagrams, custom charts
- very quick rendering
- print function

In this situation, the scheduler simulates a different scenario in order to avoid a delay in delivery.
Practical examples of Asprova’s user interface

Resource Gantt chart displaying availability of machines, personnel and material.

Different display formats:

Excel-like spreadsheet view enables copy/paste to and from Excel, search, replace, auto fill, undo, error check (errors signalised by change of background colour).

Graphic display of changes in: raw material inventory, production, consumption, incoming material, shipping, production and consumption volume, etc. Changes are visible in advance. Inventory data can be issued and exported periodically.

Display of load for all resources. The view can be expanded to trace the load back to individual orders. Easy export of load data, e.g. to Excel.

Graphic display of master data enables graphic control of inserted data and of process flow.

Custom charts: Different diagrams can be combined on one screen.
Asprova makes the scheduling of complex relationships possible

Additional functions for highly efficient scheduling

Pegging of sales and manufacturing
- automatic issuing of manufacturing orders based on sales data, backwards scheduling and assignment to required deadline
- pegging of manufacturing schedule and sales orders with regard to delivery dates
- issuing of sales schedule based on annual or monthly manufacturing schedule

Pegging of purchasing and manufacturing
- issuing of medium and long term purchasing schedules
- consideration of current purchasing schedule as a restriction when issuing manufacturing schedule
- setting of purchasing lot sizes
- replenishment of raw material inventory in regard to delivery data and sales orders

Time constraint MAX
- setting of maximum time in between processes
- application: semi-finished products with limited durability, e.g. foods, chemicals, etc.

Resource lock
Resources can be locked for certain periods after completed manufacturing, e.g. for refuelling, lubrication, etc.

Event settings for all resources
E.g. automatic scheduling of maintenance after a certain frequency or period of use, setup times, etc.

KPI (key performance indicator)
Calculation for entire projects or for individual orders, resources or products from a total of 51 values; examples for available KPIs and settings: turnover, material costs, hourly rates, external costs, total costs, profit, quota of delivery date reliability, production lead time, setup time quota, level/value of inventory, etc.

Optimisation logic
Optimisation of work sequences according to properties, e.g. integration of product lots from the same period, sorting from lighter to darker colours, from thin to thick sheet metal, from high to low oven temperatures, etc.
Swift integration into existing systems

Maximum flexibility due to high integration ability and plug-in system

Easy and swift integration into existing IT systems is one of Asprova’s great strengths.

Should adaptations be necessary nonetheless, applications can be integrated as plug-ins in Visual Basic, C++ or via the integrated expression editor. This allows for menus, dialogues, data display and configuration, scheduling logic, etc. to be extended through individual expressions.

Since the plug-in system is based on Microsoft Standard COM technology, anyone acquainted with Visual Basic or macro commands for Excel or Access is able to create plug-ins for Asprova APS. No changes to the core system are necessary and update capability remains.

Asprova features a differential import and export function for data transfer in order to minimise data volumes. In doing so, actualisations only consider changed data and make alterations visible on the spot.

Most important technical features:

- Built-in expression editor renders subsequent programming unnecessary
- Supports modern XML-technology, enabling communication with ERP system via internet
- Import and export of master data and scheduling results
- Supports Visual Basic for Applications, certified by Microsoft
- Communicates with customary OLE databases, e.g. SQL Server, Oracle, Access, etc.
- Import and export property conversion expression
- Differential data import and export
- Primary keys can be adapted
- Data sequence in database is insignificant
- Data filter expression
- Text files as CSV or tab-separated; supports Unicode
- Individual labelling and sequence of elements
- Separate selection of chart elements for import/export
- Individual setting for each chart

Built-in expression editor renders subsequent programming unnecessary:

Formulae can have an influence on several aspects of operating setup, timing, user interface, database connection, etc. Their programming is similar to that of macros and even covers complex situations which would otherwise require external programming. Efficient settings of master data can drastically reduce data volume.

Through field mapping you can easily define correspondences between Asprova and external systems.
Ingenious scheduling logic with numerous real life parameters used by lean manufacturers:

- scheduling with finite resource capacities
- backwards or forwards calculation of each individual order
- backwards: from date of delivery to latest possible starting point (just-in-time calculation)
- forwards: earliest date of completion from point of scheduling (for rush orders)
- bottleneck calculation (pull-push calculation): priority on reduction of overall lead time, i.e. starting point of upstream is optimised according to process availability of bottleneck operation
- automatic operation splitting
- assignment with load levelling (Heijunka)
- variable property settings for pegging similar lots
- minimisation of setup times for each process through product pooling
- automatic pegging of orders with complex conditions
- pegging of inventory and period-specific safety stock, material constraints
- operations can be performed while scheduling, e.g. keep assigned location, changes in master data, import & export
- prioritisation of scheduling parameters
- selection of certain offers, processes, resources and products through filter option

Extensive scheduling parameters from top lean manufacturers

A complex real life example

Within the operation flow, the product passes through four different machines two to three times. Scheduling can become highly complex when handling hundreds of orders containing different products, cycle times and volumes. Asprova masters these challenges easily.

Scheduling optimum timing of setup. Setting of setup timing for all machines.

→ setup never takes place on two machines simultaneously in order to optimise resource usage of setup team and to avoid interruptions in work flow.

Become a time winner in manufacturing with Asprova APS

www.asprova.eu
Through fast and realistic analysis of manufacturing processes, bottlenecks can be localised promptly.

Before: lead time of 21.03 days

After: lead time of 14.55 days

Lead times are shortened drastically through optimisation of respective operations down to the last detail.

Achievements of Asprova users:
- reduction of scheduling effort: 2 staff-hours per day instead of two employees
- reduction of inventory of WIP by 60%
- increase in productivity by 20%
- increase in manufacturing capacity by 20% through shorter changeover times
- high improvement in on-time delivery
The lean scheduling instrument
for the entire manufacturing industry

Asprova users: from multinational corporation to medium-sized business

The users of Asprova are companies from both make-to-order manufacturing and batch production, from medium-sized business to multinational corporation.

A further significant performance parameter is Asprova’s orientation towards the requirements of lean production. Established in 1994, it has ever since been the goal of the Asprova developers to meet the specific demands. Today Asprova is regarded as the best lean scheduler worldwide – which is only confirmed by the list of references.

The world elite of lean production use Asprova:

The most renowned Asprova users in Japan read like a “who-is-who” of Japanese top businesses. With a market share of 52.4 %, Asprova is the outstanding market leader among schedulers.

Renowned Asprova users in Europe:

Also the European manufacturing industry is discovering the outstanding advantages of Asprova for lean production.

A current list of references can be found online at www.asprova.eu

Counting a number of more than 1,300 users, Asprova can be found in all areas of the manufacturing industry:

- **Electric/ electronic industry:** LEDs, connectors, micro processors, wafers, circuit boards, speakers, ceramics, clocks, semiconductors, DVDs, electric wires, LCD screens, stereo systems, mobile phones, TFT units, fibreglass wires, digital cameras, refrigerators, lighting, sensors, signals, solar equipment, batteries, computers, notebooks, etc.

- **Automotive industry:** Engines, doors, bodywork, design, component development, plastic parts, mould manufacturing, bumpers, cables, tubes, rubber parts, brakes, seats, gearboxes, motorcycles, etc.

- **Mechanical engineering:** Machine tools, agricultural engines, industrial engines, optical instruments, ventilation systems, heating systems, electric tools, centrifuges, test machines, tanks, turbines, vacuum pumps, packing machines, etc.

- **Metal processing:** Finishing tools, wires, steel construction, steel production, sheet metal parts, fences, blades, sheet metal, coils, cogwheels, metal springs, sheet copper, ship panels, tool cutters, magnets, etc.

- **Non-metal parts:** Plastic products, corks, packaging, textiles, paper, rubber products, UV ink, ceramics, catalysts, dental materials, etc.

- **Consumer goods:** Foods, plastic bags, stationery, apparel, cosmetics, toys, etc.

- **Medical goods:** Medical equipment, laboratory equipment, medication, hospital equipment, etc.

- **Chemical goods:** Polyethylene, silicon, motor oil, asphalt, etc.
Flexible system architecture enables optimal adaption

Asprova’s modular structure for versatile scheduling functions:

- **APS** (= LS + MS + sales option + purchasing option): long, medium and short term scheduling of sales, manufacturing and purchasing – in one module
- **MS**: medium term scheduler; issues detailed advance scheduling for individual work places and issues work instructions
- **LS**: long term scheduler; conducts high-precision long term scheduling
- **MRP**: calculates material requirement in ultra-high speed
- **BOM**: input and editing of BOM (product master data)
- **MES**: display of Gantt charts (=scheduling), e.g. for workshop; result input
- **KPI**: calculation and evaluation of key performance indicators
- **DS**: (Data Server): data integration from different Asprova modules
- **NLS**: (Network License Server): enables access to Asprova from any computer within the network

<table>
<thead>
<tr>
<th>System-Module</th>
<th>Funktionsmodule</th>
<th>Optionen</th>
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<tbody>
<tr>
<td></td>
<td>GIU / Ergebnisse</td>
<td>BOM Eingabe</td>
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**Abbreviations:**

- **GIU** = graphic user interface
- **BOM** = bill of material
- **MRP** = manufacturing resource planning
- **FCR** = finite capacity rough scheduling
- **FCS** = finite capacity scheduling
- **KPI** = key performance indicator; economic indicators determining progress of essential goals or critical success factors
- **MES** = management execution system; link between machine controls and management system
- **DS** = data server
- **NLS** = network license server
Free trial* version with full functionality

The free trial version is equivalent to the fully functional Asprova APS full version, however limited to a number of 250 operations.

With this trial version you can test all applications, enter master data, install interfaces for external systems, adjust table elements, develop and set plug-ins, etc. Essentially, you can do anything except for scheduling based on extensive data volumes.

Should you decide to purchase a full version later on, you will be mailed a hardware dongle which will enable you to process greater data records.

The free trial version includes detailed documentation to help you learn to use Asprova and to conduct a model calculation.

If you are a manufacturing company, we will be pleased to send you a free trial version. Please feel free to contact us!

Available Asprova language versions:
English, German, French, Spanish, Portuguese, Polish, Lithuanian, Japanese, Chinese, Korean, Thai
The trial version is in English.
* only for confirmed manufacturing companies

Worldwide support

A worldwide partner network in nearly all industrial countries (marked green on map) enables on-location customer support.